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Shells of Land and Water.¹—This work is a diversion from the usual type of conchological publications, the author endeavors to popularize the study of the mollusks by a narrative. A quartette consisting of a professor and three students, take various trips to the “homes” of the land, fresh-water and marine species; these trips are supplemented by frequent visits to the museum, thus in a general way all of the more important groups are studied. Their first excursion is to the “home” of the fresh-water clam, then a day with the snails of the pond, river and brook, followed by a visit to the museum. The homes of the land snails are next invaded and the evening is spent in the snailery. The next chapter is “how snails eat” with figures of radula, jaws, etc. To study the exotic forms the museum is again visited. In the same manner the marine forms are studied, with instructions for dredging and preserving specimens. The work closes with “some books to study” and a glossary of technical terms.

The book contains 175 pages, the illustrations in the text, of which there are upwards of 150, are excellent and well selected, while the eight colored plates are beautiful examples of the three color process; the work is also embellished by six half-tone plates from photographs showing the homes of the various mollusks. To those taking up the study of conchology as a pastime the work is admirably adapted.

C. W. J.

BOTANY.

Pfeffer's Plant Physiology.—The completion of the second edition of Pfeffer's *Pflanzen physiologic*² is a significant event. Ten years ago Pfeffer began the revision which has just been completed. It would have been finished earlier but for the continued ill health of the author. Pfeffer's aim, as pointed out in reviews of the parts which have previously appeared,³ has been to present the science as

¹ Baker, F. C. *Shells of Land and Water. A familiar Introduction to the Study of Mollusks.* Chicago, Mumford, 1903. Svo, xii + 262 pp., 215 figs.

² Pfeffer, W. *Pflanzenphysiologie. Handbuch der Lehre vom Stoffwechsel und Kraftwechsel in der Pflanze.* 2 te Auflage, 2 vols., Leipzig, Engelmann, 1897-1904.

³ *American Naturalist*, vols. XXXII, pp. 450-1, 1898, and XXXVI, pp. 594-5, 1902.

it is at present, to separate fact from theory, to examine each hypothesis, discarding the false and emphasizing the probably true. Besides the enormous amount of reading required, Pfeffer and his assistants have done a great deal of experimental work, testing in his own laboratory the work and conclusions reported by others. The result is a critical mastery, on Pfeffer's part, of the whole subject of plant physiology, such as no other man possesses, and the fruit of this mastery is his book. The book, in presenting the science as it now is, shows what is known and thought, how much more this is than when the first edition was published nearly twenty-five years ago; it shows also how indefinite our knowledge is, how inadequate our thoughts, and how limited the field of investigation has hitherto been. As remarked in a previous review, the plant physiology of to-day is the result of the study of higher plants mainly. The lower plants have been more carefully studied by physiologists during the last five years than ever before. The results of this study are evident and valued. When the physiology of these plants is understood even to the extent to which we now understand the physiology of higher plants, plant physiology will bear a different aspect from what it does to-day. In the second as in the first edition, Pfeffer divides his subject into *Stoffwechsel* and *Kraftwechsel*. To these classical headings a third is now sometimes added, *Farmwechsel*. Though this last is but a special aspect, a special result, of the other two, it is a result which will certainly become increasingly important as it becomes increasingly evident from the experimental investigation of simpler plants.

From Pfeffer's book it is clear that the study of the influence of the various factors of the environment upon the form of living organisms stands, in results, far behind our knowledge of these factors upon the immediate behavior of living organisms. In this last part of the *Handbuch* we have mainly the subject of movements. These are examined in detail. The mechanics of movement are better understood than the action of the stimulus upon the living organism, but in both cases the phenomena are so complicated and often so contradictory in different forms that it is impossible to make a general statement of the subject which would be both clear and truthful. For this reason this part of Pfeffer's book possesses in the extreme those qualities for which the earlier parts have been most severely criticised, *viz.*, lack of definite summary statements, repetitions, and minute argumentative criticism. Summary statements which would be true cannot now be made. Repetition is unavoid-

able because of the original division of the subject, but it is always a repetition from a different standpoint, giving the reader a more comprehensive view of the subject. And only by minute criticism of what has been published is it possible to distinguish fact from theory, and well-founded theory from that which is only plausible.

This book will serve as the basis, the inspiration, and the critical guide of the investigations of the next twenty years. The future is not likely to give us another book by one man who is master of the whole field. This book stands as a monument to Pfeffer's learning. The books which follow it will be written by several masters working together, as is already the case in animal physiology.

It may not be out of place to mention here that the Philosophical Faculty of the University at Göttingen have awarded the 12,000 mark prize of the Otto Vahlbruck Foundation to Pfeffer, justly considering his *pflanzenphysiologie* the most worthy contribution to botanical science which has been made in years.

The excellent English translation by Ewart, the first two parts of which have appeared,¹ will be cordially welcomed when completed.

G. J. P.

¹ Published by the Clarendon Press, Oxford.